# Viburnum Trend
# Lead Haul Roads Site
## EPA ID No: MON000704445
## Reynolds, Dent, and Iron Counties, MO

Presented by

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# Overview of VTLHR Site

- Roads comprising over 100 miles of highway located within the Viburnum Trend of Missouri's southeast mining district known to be traveled by haul trucks transporting lead ore concentrate between mines, mills and smelters.
- Surface soil adjacent to haul route roads known to be contaminated with lead.
- VTLHR Site consists of residential houses within 200 feet of the haul route roads.

# The Viburnum Trend: Background

- Mined since early 1960s.
- 10 mines, xx mills, and 1 smelter.
- Missouri Department of Transportation (MoDOT) Investigation in 1996.
- Herculaneum Lead Smelter Site Investigation 2001.
- Pre-CERCLIS Site Screening 2001.

# Pre-CERCLIS Site Screening

- Collected >400 samples in haul road right of way (<20 feet) and analyzed with XRF and laboratory.
- Lead average was 1599 ppm with a high of 48,100 ppm.
- Published background 13 - 40 ppm.
- Site-specific measurement of background lead proved difficult.

# Pre-CERCLIS Site Screening (Cont.)

- 12 highway segments identified where elevated lead (>400 ppm) coincided with residential populations.
- Recommended CERCLIS entry and a removal assessment on each segment.

# Removal Assessment Objectives

- Determine lead concentrations in residential yards along haul roads resulting from wind-blown deposition of lead ore concentrate
- Compare results to risk-based action levels.
- Evaluate the need for a removal action.

# Project Design

- Windshield surveys identified number of homes within 200’ of roadway.
- Notification letters hand-delivered requesting sampling access.

  -Appx. 50% granted access.
- Logistical considerations

# Sampling Plan

- Modeled after an EPA removal action QAPP used in southwestern MO mining site.
- Designed to provide enough data for removal action to proceed without further investigation.

# Sampling Plan (cont.)

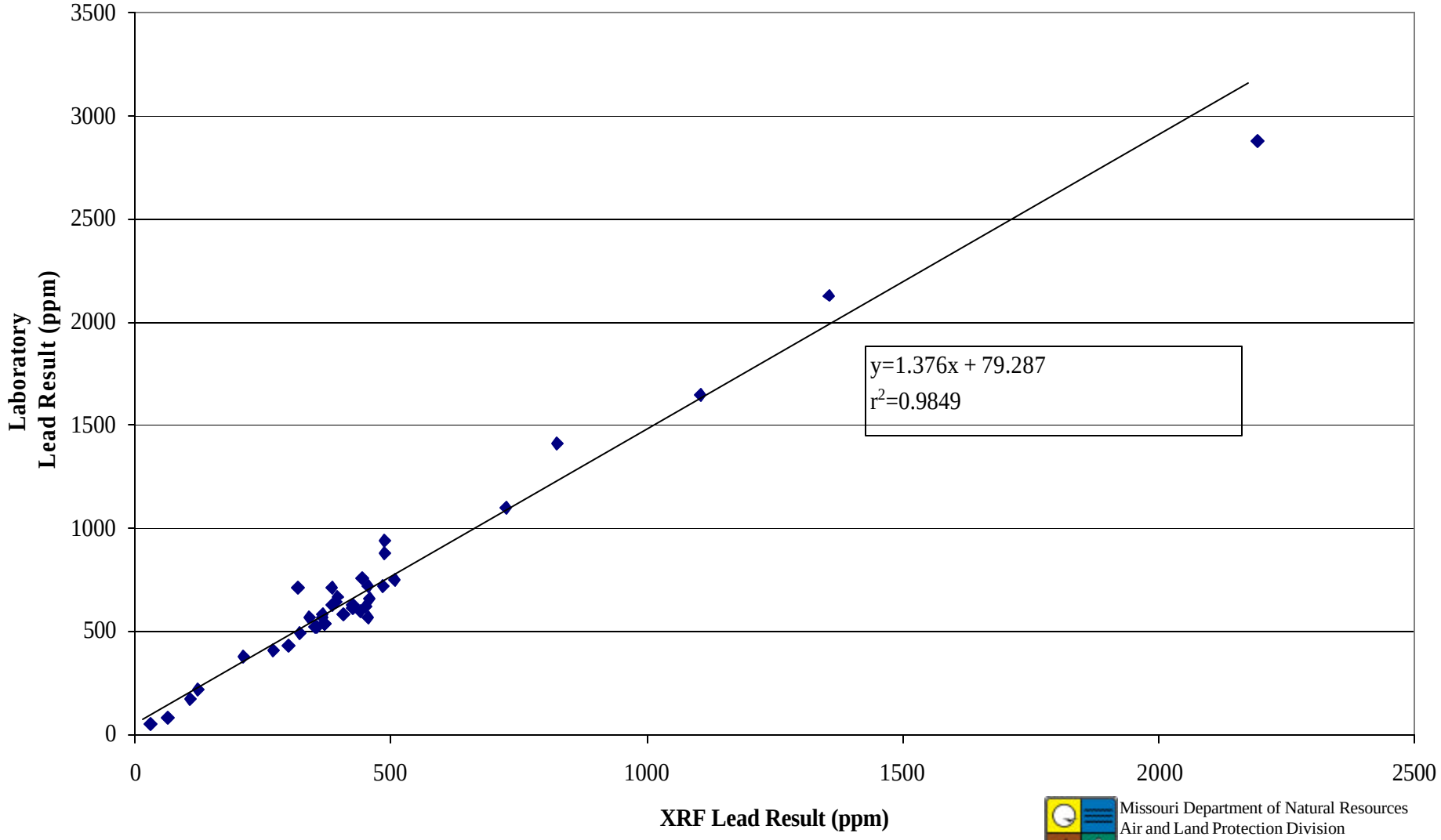
- Residential yard divided into quadrants.
- Composites of nine equally-spaced aliquots collected from within each quad.
- Play areas and gardens sampled separately.
- Standardized field sheets used to record site sketch, sampling data, GPS, distance to road, digital photo, contact information.
- Four 2-person teams conducted sampling of several segments concurrently.

Insert field sheet

# Data Analysis

- All composite samples analyzed with Niton XRF in triplicate.
- 10% split for fixed laboratory analysis.
- XRF data biased low vs. lab data.
- Correlation between XRF and lab results very good ($r^2$-0.9849).
- Adjusted all XRF data using regression analysis.

**XRF Vs. Laboratory Data for Lead**
**Viburnum Trend Lead Haul Roads Site**
**Samples From Segments 01,04,10,11,12,13,14**

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# Sampling Summary

- 7 of 12 Segments completed to date
- 89 houses sampled
- 382 quadrants, gardens & play areas

# Sample Results

- 90 quads (24%) > 400 ppm lead.
- 42 houses (47%) with at least 1 quad >400 ppm lead.
- 1 house with a quad >2,500 ppm (time critical).
- 810 ppm average lead at houses >action level.
- Only one garden > 400 ppm, no playareas.

# Sample Results (Cont.)

- Avg distance to road for houses exceeding 400 ppm lead was 77 feet vs. 97 feet for houses below 400 ppm.
- Most contamination in Q1 & Q2, but 22 Q3/Q4 quads exceeded 400 ppm

# Summary

- Legacy of lead mining in Missouri - mine waste, mill waste, impoundments, smelters. Now may need to add deposition from trucks along haul routes as a concern.
- 42 residences (47% sampled) exceeded the lead health based benchmark (400ppm)
- Only 50% of yards in study area were sampled.

# Recommendations

- 1 time-critical removal action
- 42 non time critical removal actions
- Health consults
- Checking for correlation between elevated blood lead levels in contaminated yards.
- EPA Region VII to take lead on removal action

# Issues of Concern

- Removal vs. remedial action.
- PRPs include mining and trucking companies.
- Ramifications for concept of “cradle to grave” waste management within lead mining industry in Missouri.
- Heightened concern from recent health studies on lead.

# Next Steps

- Removal Assessments of remaining 5 VTLHR segments.
- City of Viburnum
- Assess other haul routes in Missouri